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Published in:
Annals of Pharmacotherapy

DOI:
[10.1345/aph.1C073](https://doi.org/10.1345/aph.1C073)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2003

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

van Dijk, K. N., Pont, L. G., de Vries, C. S., Brouwers, J. R., & de Jong-van den Berg, L. T. (2003). Prescribing indicators for evaluating drug use in nursing homes. *Annals of Pharmacotherapy*, 37(7-8), 1136-1141. <https://doi.org/10.1345/aph.1C073>

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Prescribing Indicators for Evaluating Drug Use in Nursing Homes

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Lolkje TW de Jong-van den Berg

OBJECTIVE: To evaluate drug use in 2 Dutch nursing homes (254 residents) by developing and evaluating prescribing indicators based on pharmacy prescription data.

METHODS: We evaluated the prescribing of benzodiazepines, nonsteroidal antiinflammatory drugs (NSAIDs), ulcer-healing drugs, and diuretics. Prescribing indicators were used to identify prescribing that was potentially not in line with recommendations in national and regional prescribing guidelines. We used both descriptive indicators, such as the number and percentage of users, and indicators reflecting potentially suboptimal prescribing, such as use of drugs outside the regional drug formulary, use of >1 drug from the same drug class, and prescription of drug dosages above recommended values. When potentially suboptimal prescribing was found, we verified the findings by means of an interview with 1 of the prescribers.

RESULTS: The prescribing indicators we assessed were generally in agreement with national and regional guidelines. However, prescribing of NSAIDs without concomitant prescribing of gastroprotective drugs was found in a relatively high number of patients. After prescriber interview and patient chart review, it was found that some prescribing indicators, such as dosages above recommended values, were not always indicative for suboptimal prescribing.

CONCLUSIONS: This pilot study showed that prescribing indicators based solely on pharmacy prescription data can be a useful tool to evaluate drug prescribing. With some of these prescribing indicators, we identified cases of potentially suboptimal prescribing. However, with other indicators such as those based on drug dosages, we could not identify suboptimal prescribing, and clinical information from the prescriber was necessary to get insight into the appropriateness of prescribing.

KEY WORDS: drug use, nursing homes, prescribing indicators.

Ann Pharmacother 2003;37:1136-41.

Published Online, 16 Jun 2003, www.theannals.com, DOI 10.1345/aph.1C073

Appropriateness of prescribing has gained much attention in studies about the quality of health care.¹⁻⁵ This is particularly true for elderly and nursing home patients. In view of the high rate of drug use, age-related pharmacokinetic and pharmacodynamic changes, and multiple comorbidities, elderly patients are at a higher risk of adverse drug effects (ADEs).^{1,2,6,7} Schmader et al.² defined appropriate prescribing as the selection of a medication and instructions for its use that agree with accepted medical standards. These standards are based on efficacy, ADEs, and cost-effectiveness, and are derived from national and international guidelines, clinical trials, and expert opinion. Today, the concept of evidence-based medicine is included in daily medical practice. Evidence-based medicine is not

only based on external clinical evidence, but also on individual clinical expertise.⁸ To assess medication appropriateness, indicators that reflect deviations from national pharmacotherapy guidelines and drug formularies should be used.⁹ The development of pharmacotherapy guidelines specifically for the elderly is generally limited. In the Netherlands, initiatives for Dutch nursing home patients are currently being developed.¹⁰

Several tools have been developed to assess the appropriateness of prescribing in the elderly.¹⁻⁵ Many of these were designed for assessing medication appropriateness in elderly outpatients rather than nursing home residents. Internationally, several studies have been published on prescribing indicators for elderly outpatients and nursing home residents.¹¹⁻¹⁵ In the Netherlands, however, studies on prescribing indicators are currently lacking. Prescribing indicators used in one healthcare system are not automatically

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applicable to other healthcare systems due to differences in national pharmacotherapy guidelines and drug formularies. Furthermore, for many prescribing indicators, information on clinical status, such as laboratory results or diagnoses, is necessary. This hampers a quick and effective use of these indicators because in most countries, such as the Netherlands, clinical information is not readily available in pharmacies. Therefore, we wanted to evaluate prescribing in nursing homes with indicators that could be used with pharmacy data only.

Appropriateness criteria for medication use in nursing homes developed by Beers et al.¹¹ were based on expert consensus. They consisted of a list of 23 medications that should be avoided and 13 medication doses, frequencies, or prescription durations that generally should not be exceeded. An update, including clinical information such as the prescribing indication and potassium level monitoring, was published in 1997.¹² As Beers' criteria list several medications that are not available in the Netherlands or are not in accordance with Dutch pharmacotherapy standards, some of these criteria cannot be applied to Dutch nursing homes.

In 1997, Lunn et al.⁷ developed a set of 18 explicit criteria, based on expert opinion, to identify inappropriate prescribing in 101 nursing home residents in the UK. For 7 of the 18 criteria, information on clinical status or diagnoses of the residents was necessary, again making them unsuitable for use with pharmacy prescription data only, although some of them could be incorporated. Two Swedish studies assessing medication appropriateness used criteria that were based on Swedish guidelines for measuring inappropriate use of psychotropic drugs in the elderly.^{13,14} In 1 study, the availability of clinical information for 4 of 13 criteria was required¹³; in the other study, this was the case for 1 out of 10.¹⁴

The Medication Appropriateness Index (MAI), developed by Hanlon et al. in 1992,¹⁵ was found to be the most reliable and valid instrument for assessing medication appropriateness in elderly outpatients.¹ To our knowledge, the MAI has not been used to assess medication appropriateness in nursing homes. In view of the differences in drug use and living circumstances between elderly outpatients and nursing home residents, criteria for medication appropriateness are not necessarily the same for both populations. The MAI consists of 10 questions assessing the appropriateness of a prescribed medication. For 4 questions, information on diagnoses is necessary. The other 6 questions might be suitable for use with pharmacy prescription data only, such as, "Are there clinically significant drug-drug interactions?" and "Is there unnecessary duplication with other drug(s)?" However, we considered aspects concerning directions of use, such as patient leaflets, not to be as relevant to the appropriateness of nursing home prescribing as nurses ensure adequate administration of the drugs.

Recently, a list of 12 quality indicators based on literature review and expert panel consideration was published.⁵ For 5 quality indicators, clinical information such as drug indication, response to therapy, or renal function was need-

ed. One indicator concerned a drug not available on the Dutch market. Another indicator concerned patient education, an item that could be relevant in view of monitoring ADEs by caregivers. The quality indicators that could be used with pharmacy prescription data only included the availability of a medication list, periodic drug regimen review, avoidance of drugs with strong anticholinergic properties, and avoidance of barbiturates, although we consider the latter a less clinically relevant problem in view of the limited use of barbiturates in the Netherlands.

We found the indicators described above not suitable for our evaluation of drug use with only pharmacy prescription data as the information source. Therefore, we decided to develop prescribing indicators based solely on prescription data obtained from hospital pharmacies to evaluate drug use in 2 Dutch nursing homes. In an earlier study among nursing home patients, we found that use of benzodiazepines, loop diuretics, ulcer-healing drugs, and nonsteroidal antiinflammatory drugs (NSAIDs) was relatively high and the duration of drug use was relatively long.¹⁶ We expected that prescribing of these drugs could potentially be improved. Therefore, we focused on these 4 drug groups.

Methods

SETTING

The study was carried out in 2 nursing homes: 1 for somatic care (home A; 134 residents) and 1 for psychogeriatric care (home B; 120 residents). Both institutions were comparable with regard to the medical, pharmaceutical, and nursing care provided. Five nursing home physicians (3 in home A, 2 in home B) provided medical care on a daily basis. Each ward was visited twice a week, and a nursing home physician was on call 24 hours a day. Both facilities were served by the same hospital pharmacy. All drugs dispensed to the residents were registered in the hospital pharmacy computer system. Any changes in medication were updated on a daily basis in the hospital pharmacy computer system and a complete medication history was kept for each resident. Medication was administered to nursing home residents based on information recorded in the computer system, such as drug, dosage, and route and time of administration. Hospital pharmacists carried out medication surveillance. At the time of the study, no computerized medication surveillance was available. Clinical information on patients is not readily available to hospital pharmacists in the Netherlands, and hospital pharmacists do not visit wards regularly. If prescriptions lead the pharmacist to query for inappropriateness and clinical information is needed, then the prescribing physician is contacted by telephone.

DEVELOPMENT OF PRESCRIBING INDICATORS

We sought to evaluate prescribing practices with regard to NSAIDs, benzodiazepines, diuretics, and ulcer-healing drugs by use of pharmacy prescription data only. The prescribing indicators we developed fell into 2 groups (Table 1).^{17,18} Indicators in group (a) were descriptive in nature and, consequently, no optimal value was defined. We calculated the proportion of patients in each nursing home who were prescribed benzodiazepines, NSAIDs, diuretics, and/or ulcer-healing drugs. Group (b) indicators reflected potentially suboptimal prescribing. Examples of these indicators that were applied to all 4 drug groups were number of patients who used drugs outside the regional drug formulary and number of patients who used >1 drug from the same therapeutic drug class (e.g., 2 benzodiazepines, 2 ulcer-healing drugs, or 2 NSAIDs). Both indicators could identify potentially suboptimal prescribing. The latter indicator was not applied to the group of diuretics, as the combination of a loop diuretic and a thiazide diuretic may sometimes be useful in heart failure and hypertension.

The appropriateness of drug dosage was assessed by comparing the actual prescribed daily dose (PDD)¹⁹ with the recommended dose for the elderly, expressed as the defined daily dose (DDD).²⁰ For benzodiazepines, the recommended dosage for elderly people is 0.5 DDD.¹⁷ For the other drug groups, the recommended dosage was set on 1 DDD, as no specific recommendation for elderly patients exists.¹⁸

Furthermore, 2 drug combinations were studied, both concerning NSAIDs. First, coprescribing of NSAIDs and loop diuretics was evaluated because NSAIDs may decrease the efficacy of diuretics and induce congestive heart failure.^{18,21} Second, the concomitant use of gastroprotective drugs (proton-pump inhibitors [PPIs]) during NSAID therapy was studied. In view of the risks of NSAID therapy in the elderly,²² not to prescribe a gastroprotective drug concomitantly could be regarded as suboptimal prescribing.

EVALUATION OF DRUG PRESCRIBING BY PRESCRIBING INDICATORS

We evaluated the prescribing of benzodiazepines, NSAIDs, diuretics, and ulcer-healing drugs retrospectively by using the prescribing indicators described above. Pharmacy prescription data were collected for 1 day (point-prevalence). For 1 of the indicators (drug choice outside the regional drug formulary), we evaluated drug use against the regional drug formulary,²³ which was based upon national evidence-based prescribing guidelines.^{18,24} Table 2 presents the drugs listed in the regional drug formulary.²³

VERIFICATION OF PRESCRIBING INDICATORS

To assess the usefulness of the indicators, we verified the cases of potentially suboptimal prescribing by means of an interview with one of the prescribers. In a sample of patients ($n = 25$) reflecting the range of patients in whom the indicators suggested potentially suboptimal prescribing, the medical charts were reviewed together with information from one of the prescribers to ascertain whether prescribing for these patients was indeed suboptimal. For 1 indicator (i.e., coprescribing of NSAIDs with gastroprotective drugs), patients given both drugs — suggesting optimal prescribing — were reviewed. The information was collected during a 3-hour interview.

Results

EVALUATION OF DRUG PRESCRIBING BY PRESCRIBING INDICATORS

The results are summarized in Table 1. The results with regard to the indicators assessing potential suboptimal prescribing (group [b] indicators) are also briefly described below.

Benzodiazepines were prescribed at daily dosages >0.5 DDD in 11 of 41 patients in home A and 8 of 33 patients in home B. Three patients were prescribed a nonformulary benzodiazepine. Six of 41 and 1 of 33 patients received >1 benzodiazepine at the same time. NSAIDs were prescribed at dosages >1 PDD in 7 of 14 and 1 of 6 patients, respectively. All NSAIDs prescribed were formulary drugs. No patients received >1 NSAID. Three of 14 and 1 of 6 patients were prescribed a loop diuretic simultaneously. Eleven of 14 and 6 of 6 NSAID users, respectively, were not prescribed a gastroprotective drug concomitantly. Diuretics were prescribed at dosages >1 PDD in 7 of 41 and 3 of 16 patients, respectively. All diuretics prescribed were formulary drugs. Ulcer-healing drugs were prescribed at dosages >1 PDD in 8 of 34 and 4 of 16 patients, respectively. All ulcer-healing drugs prescribed were formulary drugs. There were no patients that were prescribed >1 ulcer-healing drug at the same time.

VERIFICATION OF PRESCRIBING INDICATORS

The medication of 25 patients (all from home A) with potentially suboptimal prescribing was reviewed using the medical charts and subsequently discussed with one of the prescribing nursing home physicians. We selected 8 pa-

Table 1. Evaluation of Drug Use in 2 Dutch Nursing Homes^a

Indicator	Benzodiazepines		NSAIDs		Diuretics		Ulcer-Healing Drugs	
	Home A	Home B	Home A	Home B	Home A	Home B	Home A	Home B
a. Descriptive prescribing indicators								
Users, n (%)	41 (30.6)	33 (27.5)	14 (10.4)	6 (5.0)	41 (30.6)	16 (13.3)	34 (25.3)	16 (13.3)
hypnotics	37 (27.6)	19 (15.8)						
anxiolytics	7 (5.2)	15 (12.5)						
b. Indicators of potential suboptimal prescribing (n)								
PDD >0.5 ¹⁷	11	8						
PDD >1			7 (7) ^b	1	7 (5) ^b	3	8 (5) ^b	4
Use of drugs outside formulary	1	2	0	0	0	0	0	0
>1 drug from same drug class	6	1	0	0			0	0
Combination with loop diuretic ¹⁸			3	1				
No combination with gastroprotective drug ¹⁸			11 (8) ^{b,c}	6				
DDD = defined daily dose; NSAID = nonsteroidal antiinflammatory drug; PPD = prescribed daily dose; i.e., the daily dose (in mg) divided by the DDD (in mg).								
^a Nursing home A provides mainly somatic care ($n = 134$). Nursing home B provides mainly psychogeriatric care ($n = 120$).								
^b Number of patients included in the review for verifying prescribing indicators.								
^c Only NSAID users who were coprescribed a proton-pump inhibitor were included.								

tients who received an NSAID and a PPI concomitantly. We inquired whether the PPI was prescribed to counteract the gastrototoxicity of the NSAID, thus suggesting optimal prescribing. Indeed, in 2 patients the PPI was prescribed to treat gastrointestinal ADEs of the NSAID. For the remaining 6 patients, other reasons for prescribing a PPI existed. Two patients had a diaphragmatic hernia and were prescribed a PPI to prevent erosive damage due to reflux esophagitis, and 1 was diagnosed with a duodenal ulcer. One patient was diagnosed with reflux esophagitis, and therapy with a histamine (H_2)-antagonist was not effective. One patient experienced nausea and vomiting as a result of antiparkinsonian drug therapy (levodopa/carbidopa) and was subsequently prescribed a PPI. One patient was bedridden due to spinal cord injury and was prescribed the PPI to prevent erosive damage due to reflux esophagitis.

Five patients received an ulcer-healing drug (PPI) in dosages >1 PDD (equivalent to omeprazole 40 mg). According to the nursing home physician, this might have been due to the fact that some prescribers tend to start with a high dosage to effectively heal the symptoms and taper the dosage when acute symptoms have diminished. Three patients were diagnosed with ulcer ventriculi or ulcer duodeni and were, therefore, given ulcer-healing drugs in these dosages. One of these patients was first prescribed an H_2 -receptor antagonist, but experienced central adverse effects. Of the other 2 patients, 1 patient was diagnosed with reflux esophagitis and hiatus hernia and was prescribed a PPI in high dosage by a medical specialist. This therapy was subsequently continued. The other patient was given methotrexate and experienced nausea that responded well to PPI therapy. According to the physician, ADEs were not seen with these high dosages of PPIs.

Seven patients were prescribed NSAIDs above the recommended dosage. According to the nursing home physician, this was the result of careful dose adjustments that ultimately led to these relatively high dosages. Three of these patients were prescribed acetaminophen 2–4 g/d before the NSAID was started. Severe rheumatoid arthritis and severe pain were reasons for prescribing NSAIDs in such high dosages. The necessity for these high dosages was reevaluated periodically, as well as the occurrence of potential gastrointestinal and renal adverse effects.

Table 2. Drugs Listed in the Regional Formulary²³

NSAIDs	Benzodiazepines
diclofenac	hypnotics
ibuprofen	nitrazepam
meloxicam	temazepam
naproxen	anxiolytics
Ulcer-healing drugs	diazepam
histamine ₂ -receptor antagonists	oxazepam
cimetidine	Diuretics
ranitidine	furosemide
proton-pump inhibitors	hydrochlorothiazide
omeprazole	
NSAIDs = nonsteroidal antiinflammatory drugs.	

Five patients received loop diuretics at a dosage higher than recommended. All of these patients had a diagnosis of heart failure. Careful dose adjustments in these patients had ultimately led to these relatively high dosages. Metabolic disorders such as hypokalemia were frequently monitored by measuring plasma potassium levels.

Discussion

In our study, prescribing practices in 2 Dutch nursing homes were generally in agreement with regional and national guidelines.

DRUG USE BASED ON PRESCRIBING INDICATORS

Number and Percentage of Users of Drug Groups

In the nursing home for somatic care (home A), approximately twice as many hypnotics, NSAIDs, ulcer-healing drugs, and diuretics were prescribed compared with the nursing home for psychogeriatric care (home B). This may reflect the somatic disorders that these residents experience. This descriptive indicator reflects overall prescribing practice and can be used to monitor changes in prescribing in-house over time. Comparison of prescribing practices between these homes is difficult in view of the differences in comorbidity.

Dosage of Drug Groups

The percentage of the residents receiving dosages higher than recommended varied among the nursing homes, with a minimum of 1 of 6 patients and a maximum of 7 of 14 patients affected. From the interview data, it was found that often the high dosages were the result of titration of the dosage based on the clinical effect. This was the case in particular for NSAIDs, diuretics, and ulcer-healing drugs. This indicator does not necessarily reflect suboptimal prescribing regarding these drug groups. Insight into the indication for which the drug is prescribed is needed to evaluate whether a dosage is too high.

Use of Nonformulary Drugs

Overall, 3 patients were prescribed nonformulary drugs for the drug groups studied. These patients received nonformulary benzodiazepines (flurazepam, midazolam). For these drugs, alternative formulary drugs were available and recommendations with regard to substitution could be made.

Duplication of Drugs

More than 1 drug from the same drug class was prescribed to 7 patients, and it concerned only benzodiazepine users. It may be worthwhile to limit prescribing to 1 benzodiazepine.

Combination of Drugs

Two indicators assessed the combination of drugs. One indicator identified prescribing of an NSAID and a loop diuretic, which was the case in 3 of 14 and 1 of 6 NSAID

users, respectively. Prescribing practices may be improved on this point in view of the increased risk of congestive heart failure due to potential drug interactions, although individual risk factors such as prevalent heart failure are to be taken into account. The other indicator assessed potential suboptimal prescribing when no gastroprotective drug was prescribed with an NSAID. A relatively high number of NSAID users did not receive a gastroprotective drug concomitantly. These results indicate that prescribing practices can be improved. The results are in line with a recently published study on elderly NSAID users.²⁵

VERIFICATION OF PRESCRIBING INDICATORS

From the interview and chart review data, we concluded that the prescribing indicators we investigated did not always identify suboptimal prescribing, as other reports have also found.^{26,27} An indicator that performed well was the combination of gastroprotective drugs and NSAIDs. This indicator reflects suboptimal prescribing in view of the risks of gastrototoxicity of NSAIDs in the elderly.²² In the interview, the physician stated that NSAID-related gastrointestinal toxicity does not present often in clinical practice, and this led nursing home physicians to question the clinical relevance of preventive gastroprotective measures. Recently, the nursing homes under study have changed their prescribing policies on this point. Currently, guidelines recommend prescribing gastroprotective medication to all elderly people who chronically use NSAIDs.

Indicators that assessed drug dosages above recommended values for NSAIDs, ulcer-healing drugs, and diuretics did not perform well. Often, good reasons for prescribing these high dosages existed, with the main reason being that lower dosages were not effective. Potential adverse effects were known to the prescribers and monitored periodically. Furthermore, drug doses are often dependent on the indication, and several "ideal" dosages per drug may exist depending on the indication. DDD values have been developed for purposes other than monitoring prescription appropriateness and, therefore, are unsuitable to assess appropriateness of drug dosages of these drug groups.

Indicators that are to reflect suboptimal prescribing should be sensitive and specific. It is often difficult to derive prescribing indicators solely from guidelines and formularies. This is particularly true for elderly patients, in view of the complex comorbidity and often individualized pharmacotherapy on the basis of clinical parameters. Efforts should, therefore, be directed toward development of indicators that take these issues into account. In the near future, when both clinical data, such as laboratory values, and pharmacy prescription data can be linked in automated databases, incorporation of certain clinical data in prescribing indicators may be feasible.

LIMITATIONS

We interviewed only 1 nursing home physician. Therefore, it was not always possible to determine the exact rea-

sons for prescribing by colleague physicians in the nursing home. However, because we also reviewed medical charts, most information on prescribing and medical diagnoses could be traced. Another limitation of our study was that we did not verify all prescribing indicators used in the drug evaluation, such as whether use of >1 drug from the same class was justified. Another issue is that we evaluated only a limited number of patients from home A for verification of the prescribing indicators. Although the indicators mainly dealt with medication for somatic conditions, it would be interesting to review patients from the psychogeriatric nursing home as well. Furthermore, this article presents results from a small pilot study, and findings on the appropriateness of prescribing cannot be generalized. However, the prescribing indicators developed could provide a useful tool to evaluate prescribing appropriateness.

Summary

This pilot study demonstrated that prescribing indicators based solely on pharmacy prescription data are a useful tool to evaluate drug prescribing. With some of these indicators, such as the lack of concomitant gastroprotective therapy in NSAID users or duplicate benzodiazepine therapy, we were able to identify cases of potentially suboptimal therapy. However, other indicators, such as those based on drug dosages or that addressed the combination of certain drugs, were not suitable for identification of suboptimal prescribing. Clinical information from the physician was necessary to obtain further insight into the appropriateness of prescribing.

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We thank Johannes Tideman MD for his indispensable and valuable help in collecting clinical data and André van den Brand MD for his cooperation in carrying out this study. Furthermore, we are grateful to the nursing home and pharmacy staff of both nursing homes for their cooperation in collecting prescription data.

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EXTRACTO

OBJETIVO: Evaluar el uso de medicamentos en 2 domicilios para el cuidado de enfermos (254 residentes) en Holanda mediante el desarrollo y la evaluación de indicadores de prescripción basados en datos de prescripción registrados en el sistema de computadora de la farmacia.

MÉTODOS: Se evaluó la prescripción de benzodiazepinas, antiinflamatorios noesteroideos, medicamentos para el tratamiento de úlceras, y diuréticos. Se utilizaron indicadores de prescripción para identificar la prescripción que potencialmente no estaba de acuerdo con las guías de prescripción nacional y regional. Se utilizaron indicadores descriptivos tales como el número y porcentaje de usuarios. También se utilizaron indicadores que reflejan una prescripción potencialmente subóptima tales como el uso de medicamentos que no están en el formulario de medicamentos regional, el uso de más de 1 medicamento de la misma categoría, y la prescripción de dosis de medicamentos sobre la recomendada. Cuando se encontró que la prescripción era potencialmente subóptima, se verificó los hallazgos mediante entrevista con 1 de los médicos.

RESULTADOS: Los indicadores de prescripción evaluados generalmente estuvieron en armonía con las guías nacional y regional. Sin embargo, se encontró que, en un número relativamente alto de pacientes, se prescribieron agentes antiinflamatorios noesteroideos sin prescribir concomitantemente agentes gastroprotectores. Luego de entrevistar al médico y revisar el expediente clínico del paciente, se encontró que algunos indicadores de prescripción, como dosis mayor a la recomendada, no representaban necesariamente una prescripción subóptima.

CONCLUSIONES: Este estudio piloto demostró que indicadores de prescripción basados únicamente en datos de prescripción obtenidos de la farmacia pueden ser una herramienta útil para evaluar los patrones de prescripción de medicamentos. Con algunos de los indicadores de prescripción se identificaron casos de prescripción potencialmente subóptima, y se necesitó obtener información clínica del médico para ayudar en el discernimiento de la adecuación de la prescripción.

Luz M Gutiérrez

RÉSUMÉ

OBJECTIF: Le but de cette étude était d'évaluer l'utilisation des médicaments dans 2 centres d'hébergement pour personnes âgées (254 personnes) de Hollande. Pour ce faire, des indicateurs ont été développés et appliqués à la base de données des ordonnances pharmaceutiques.

MÉTHODES: Les auteurs ont évalué la prescription des benzodiazépines, des anti-inflammatoires non-stéroïdiens (AINS), des médicaments anti-ulcéreux, et des diurétiques. Les indicateurs ont servi à identifier les ordonnances qui ne correspondaient pas aux normes nationales et régionales de prescription. Des indicateurs descriptifs, tels le nombre et le pourcentage d'utilisateurs ont été utilisés. D'autres indicateurs visaient à identifier l'utilisation potentiellement sous-optimale telle que l'utilisation de médicaments hors formulaire, l'utilisation de plus d'un principe actif au sein de la même classe pharmacologique et finalement les doses de médicaments qui dépassaient les doses recommandées. Lorsqu'une utilisation potentiellement non appropriée était identifiée, les prescripteurs étaient rencontrés.

RÉSULTATS: Les indicateurs de prescription ont démontré un bon accord avec les normes nationales et régionales. Cependant, la prescription d'AINS sans cytoprotection a été fréquemment rencontrée. La rencontre avec les prescripteurs et la révision des dossiers a démontré que certains indicateurs, notamment ceux visant les doses élevées, n'indiquaient pas nécessairement une utilisation sous-optimale.

CONCLUSIONS: Ce projet pilote a démontré que des indicateurs de prescription basés uniquement sur les bases de données d'ordonnances peuvent être utiles pour évaluer la prescription de médicaments. Ces indicateurs ont permis d'identifier des cas de prescription sous-optimale. Cependant, d'autres indicateurs, dont ceux portant sur les doses trop élevées, n'ont pas permis d'identifier de façon fiable l'utilisation non appropriée et l'information obtenue des prescripteurs était nécessaire pour évaluer la justesse de l'utilisation clinique des médicaments.

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